MODEL SM8830L
TURBIDITY / SUSPENDED SOLIDS TRANSMITTER
User Manual

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1.0 INSTRUMENT OVERVIEW

1.1 FEATURES

- Laser and fiber optic based sensor
- 2 Point automatic or manual calibration
- For use with Claritek's Intank (dip style) sensors
- 3 Differential Alarm relays (SPDT 10A contacts)
- Direct or Inverse 4-20mA output with offset capability
- RS-485 Network / Hart Protocol / Modbus protocol
- No moving parts

1.2 DESCRIPTION

The Claritek SM8830 Turbidity Transmitter has been designed for use in industrial applications to measure suspended solids in aqueous mediums.

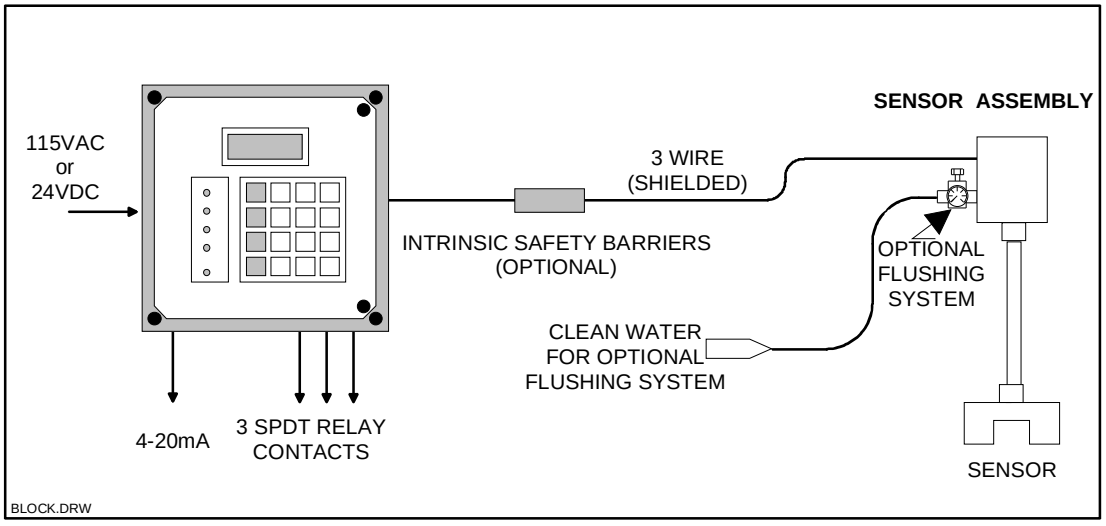
Laser light is passed via an optical fiber through the liquid under test. Another fiber directly opposite picks up the received light and conducts it to a detector. Both laser and detector are housed in a liquid tight junction box and only the optical fibers are in contact with the liquid for increased reliability. The measured light is converted to a frequency-coded signal for transmission to the SM8830 Transmitter.

The relationship between the measured light and the suspended solids concentration is mathematically predictable over the measurement range of the instrument. The coherent laser light beam maximizes the predictability as compared to incoherent light sources such as tungsten lamps and LED's.

The Sensor assembly may also contain an optional lens flushing system. Clean water is directed across the face of the source and detector windows in a cleaning action. The jets are directed downstream to minimize measurement inaccuracy caused by dilution of the liquid medium.

A 20 character by 4 line LCD and 16 key membrane keypad offer detailed data displays plus ease of calibration and setup. In addition a bar graph gives a quick indication of suspended solids concentration.

Figure 1.0



OPERATION

Laser based optical system. Extinction mode. Self cleaning sensor. The measured light is converted to a frequency-coded signal for transmission to the SM8830 Transmitter.

USER INTERFACE

Display	4 line X 20 Character LCD with optional backlight + bar graph.
Keypad	4x4 Membrane type matrix.
Network	HART RS-485 protocol or Modbus protocol

PERFORMANCE

The performance is given in Turbidity units, which are based on Formazine test solutions. The relationship between Turbidity Units and Suspended Solids Concentrations depends on the nature of the suspended solids such as average particulate size. Resolution and Accuracy for a given application can only be determined by testing.

Range	0 - 1200 NTU with a 3 level automatic gain selection.
Resolution	0.1%
Accuracy	±5% of Full Scale or better

INPUTS

4 wire plus shield connection to the Light Transmitter at the Claritek Inline Sensor or In-tank (dip style) Sensor. Maximum cable length: 200 feet.

OUTPUTS / RELAYS

4 - 20 mA output	0.05% resolution, sourced into 900 Ohms maximum load.
Relays	3 SPDT 10A/120VAC contacts. Each relay may be set for differential control (hi and low setpoints) Programmable time delay: 0 - 99 seconds. Hi Fail-Safe selectable.

POWER

115VAC / 220VAC @ 12VA or 24VDC @ 0.15A max. Each of these 3 options is set at the factory and is not field configurable.

MECHANICAL SPECIFICATIONS

Enclosure	Wall mount Nema 4X with hinged clear cover to access keypad.
Dimensions	305 mm (12”)H x 305 mm (12”)W x 203 mm (8”)D
Weight	2.2 kg (5 lb) max.

ENVIRONMENTAL SPECIFICATIONS

Operating Temp.	-5 to 70°C for Controller only.
Relative Humidity	90% max. with no condensation.

SENSOR ASSEMBLY SPECIFICATIONS

In-tank (dip style).

Operating Temp.	0 - 50°C.

2.0 INSTALLATION

NOTE: If any damage to the instrument is found, please notify a Claritek representative as soon as possible prior to installation.

2.1 SENSOR ASSEMBLY

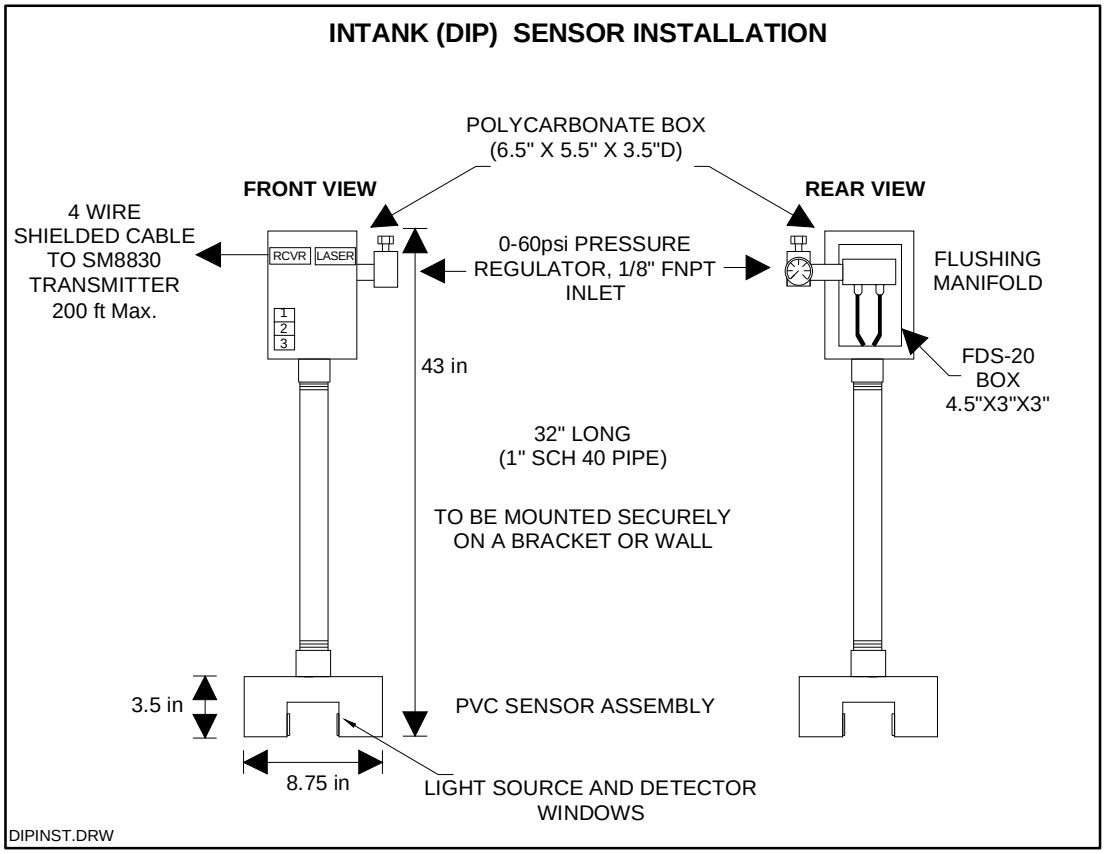
In-tank style. This consists of a PVC mallet shaped assembly with junction boxes as described above. The assembly is mounted on a structure so that the mallet end is immersed in the test liquid.

2.2 PROBE INSTALLATION

The sensor assembly is designed to be mounted directly in the liquid under test preferably in a vertical position as shown in Figure 2. It is important to mount the sensor assembly securely so that the sensor assembly is completely submersed at all times. **Important: the sensor assembly should be as close as possible to a location where grab samples of the liquid under test can easily be acquired**

CAUTION: THE PROBE ASSEMBLY CONTAINS SENSITIVE COMPONENTS. PLEASE INSTALL WITH CARE.

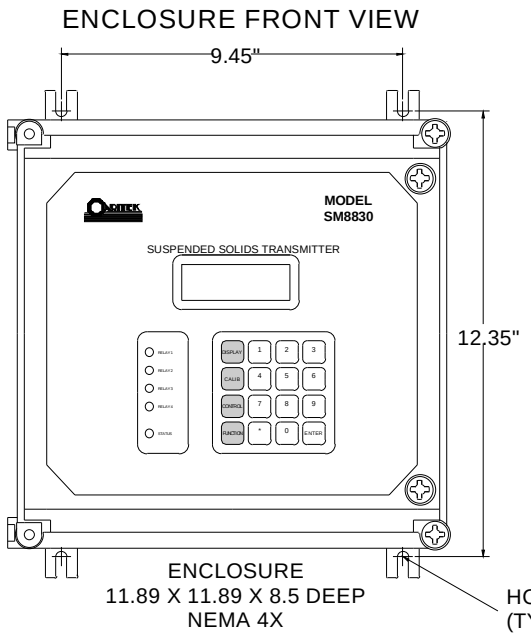
Figure 2.0



2.1 MECHANICAL INSTALLATION

Figure 2.2

MODEL SM8830 SUSPENDED SOLIDS TRANSMITTER



1- Find a location on a vertical structure to mount unit about eye level in a protected area away from direct condensation. The structure should be able to support the weight of the unit.

2- Mount the unit via bolts into the vertical structure using the 4 mounting brackets. The location dimensions are shown above.

2- BE VERY CAREFULL IF DRILLING CONDUIT HOLES IN THE ENCLOSURE WALLS SINCE THE UNIT CONTAINS SENSITIVE ELECTRONIC COMPONENTS. SHIELD ALL CIRCUIT BOARDS FROM DRILLING DEBRIS ESPECIALLY METAL PARTICALS.

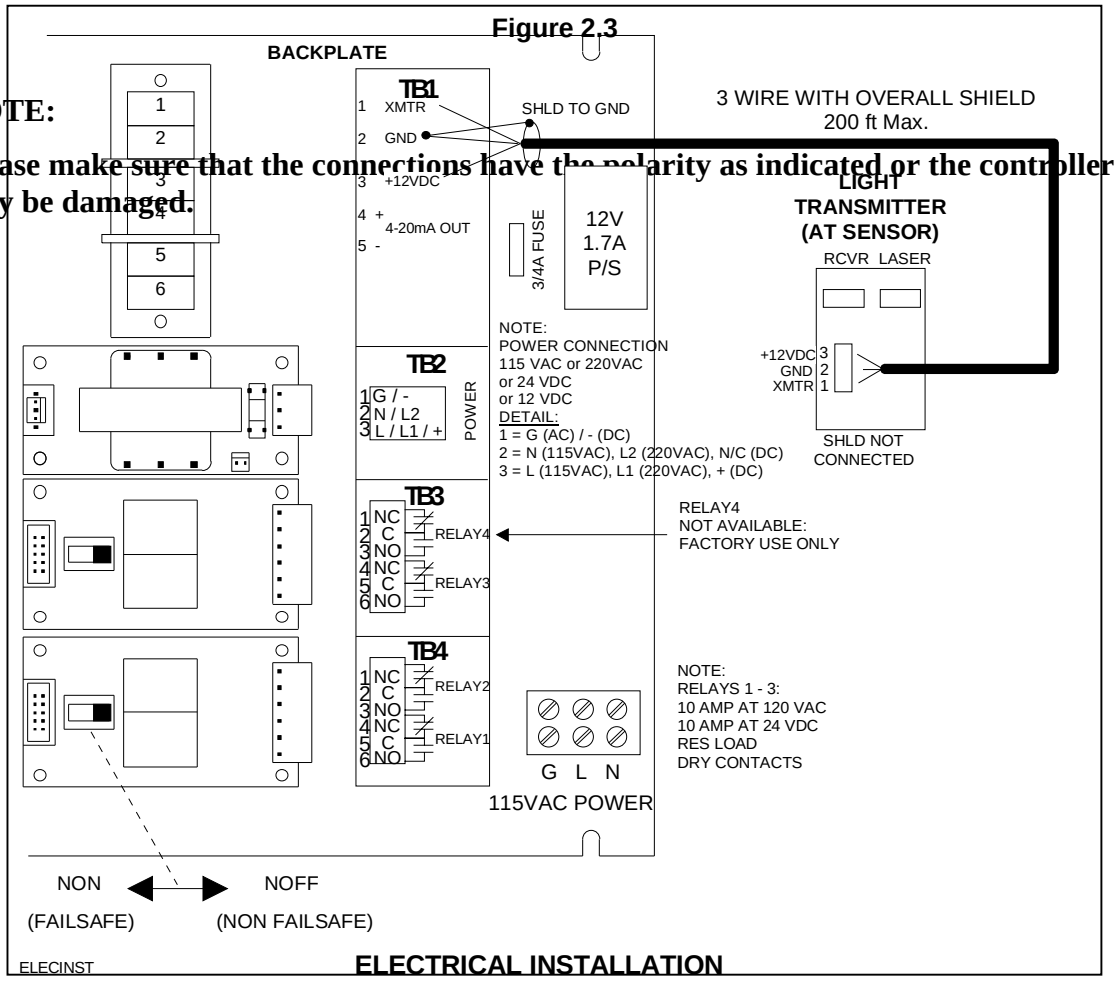
MECHINST.DRW **MECHANICAL INSTALLATION AND DIMENSIONS**

2.2 ELECTRICAL INSTALLATION

NOTE:

Please make sure that the connections have the polarity as indicated or the controller may be damaged.

Figure 2.3



3.0 STARTUP AND CALIBRATION

This section is provided for minimum setup. For a more detailed description of features please refer to Section 4.0.

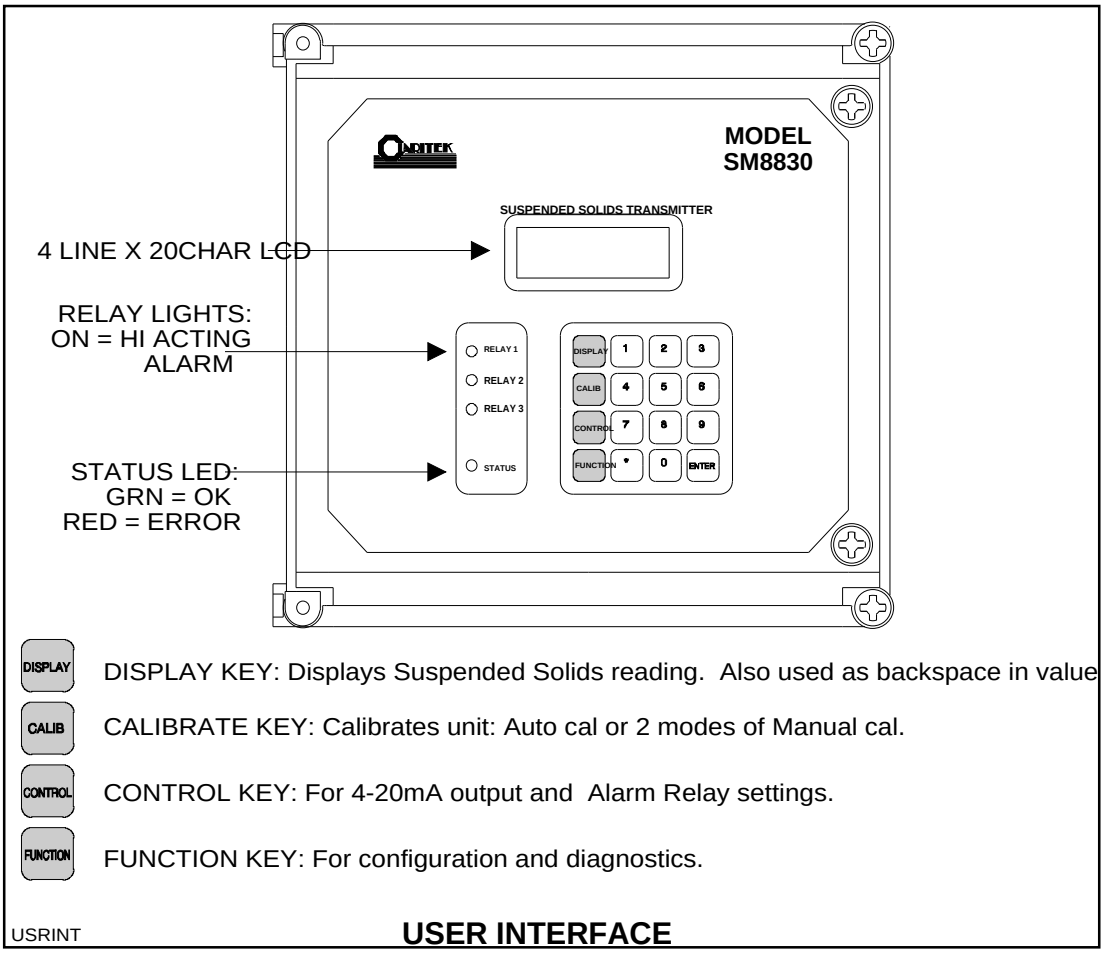


Figure 3.0

3.1 NOTES ON VALUE ENTRY

When entering in numeric values, the cursor can be backspaced to correct mistakes by pressing the DISPLAY key. This is only true if the cursor is not at the beginning of the displayed value, in which case the DISPLAY menu is entered.

The decimal point is the asterisk (*) key.

Values may be entered with any number of places of decimal.

If the entered value is out of the allowed limits, the system displays the limiting value for 2 seconds. For example if the alarm time delay value is entered as 5000 seconds then **MAX. 99** is displayed for 2 seconds then entry is allowed again. The current value is not changed unless the entered value is within limits.

During value entry, the capacitance and level are still being constantly updated in the background. Apart from the CALIBRATION menu and the DIAGNOSTICS menu, in all other menus, the Alarm relays and the 4-20mA output are also updated.

3.2 POWERUP DISPLAY

After mechanical and electrical installations of the probe and the controller have been successfully completed, power up the unit. The LCD should show a similar screen to:

****SUSPENDED SOLIDS****
200.0 ppm
Output 20.0 %
zzzz

NOTE: The shown values are for example only.

The 2nd line shows the suspended solids concentration in one of 5 engineering units that may be selected in the configuration menu as described in the next sub-section.

The 3rd line shows the SM8830 transmitter output as a percent of Full Scale (Span value)..

The 4th line displays a bargraph of the suspended solids concentration as a percent of the Output Full Scale i.e. Span value minus Zero value. The resolution is 5%.

The Status Indicator (see figure 3.0) should be green. If this is red then the LCD displays the kind of System Error. See the troubleshooting guide for details.

3.3 MINIMUM SETUP

3.3.1 DATA FILTER (SMOOTHING)

- Press the FUNCTION KEY if not already in the Function menu), then press 2 for Settings, then 2 for Filter.

********SETTINGS********
Enter number of
Samples / average:
5

- The input signal is smoothed by taking the average of a selectable number of raw readings. Enter the number of readings for the averaging calculations followed by the Enter key. The maximum is 100.

3.3.2 ENGINEERING UNITS

- One of 5 units may be selected. These units do NOT cause any change in internal calculations, but are only used for clarity. For example switching between ppm to NTU does NOT change the displayed value:

******** SETTINGS ********
1-None 2-ppm 3-mg/L
4-g/L 5-% 6-NTU

- Press the number of the desired units.

3.3.3 4-20mA SETTINGS

- Press the CONTROL key:

****CONTROL SETTINGS****
1-Relay Settings

2-4-20mA Settings
Enter selection

- Press 2 to setup the 4-20mA output:

*****SET 4-20mA OUT*****
Zero ppm 0.0
Span ppm 100.0
mA:DIR

- Enter the desired concentration level for Zero and Span values followed by the Enter key in each case. The unit automatically prompts for the Zero and Span values in the engineering units already chosen. After the Enter key is pressed for the Span value, line 3 changes to allow setting the action of the mA output:

*****SET 4-20mA OUT*****
Zero ppm 0.0
Span ppm 100.0
mA:DIR key 1 for INV

- Press key 1 to change the current setting to the alternate setting i.e. from DIRect action to INVerse action or vice versa or press the Enter key for no change.

3.3.4 RELAY SETTINGS

- Press the CONTROL key if not already in the Control Settings menu (see 4-20mA Settings display above). Then press 1 for Relay Settings:

*****RELAY SETTINGS*****
1-Setpoints
2-Enter On delay
3-Enable 4-Off OFF

- Disable the relays (factory default setting): An OFF in the bottom line can disable Alarm relay alarms even if an Alarm condition exists. The factory default setting is OFF which prevents Alarm relays from being activated until the unit is fully setup and calibrated. If ON is displayed in the bottom corner then press 4 to disable relays. **Relays can be enabled AFTER calibration and setup are complete.**

- Press 1 to enter relay setpoints:

*****RELAY SETTINGS*****
Enter value in ppm
Relay 1 HI 85.0
Relay 1 LO 80.0

- Enter the High setpoint (concentration level above which an Alarm exists) and Low setpoint (concentration level below which the corresponding Alarm is reset). Note: the unit automatically prompts for the setpoints in the engineering units already chosen.

- Enter the Hi and Lo setpoints. If Differential control is not desired then set the Hi and Lo setpoints to the same value.

- Enter the Hi and Lo setpoints for the remaining relays: 2-3.

- If no change is required to the setpoints just press the Enter key. When all relays have been setup, the RELAY SETTINGS menu is revisited.

- From the RELAY SETTINGS menu (or if not press the CONTROL key, then 1 for Relay Settings) press 2 for On delay.
- Enter the minimum time in seconds for the level to be GREATER THAN the Hi setpoint for the Alarm condition to be entered. This time is also called the Alarm delay time. Note: The alarms are all High Acting i.e. an alarm is entered when the level is GREATER THAN the Hi setpoint. Note also that the time delay applies to ALL relays.

3.3.5 CALIBRATION

AUTOMATIC CALIBRATION

*Follow this procedure if 2 KNOWN concentrations can be made **BEFORE** calibration.*

WHAT YOU WILL NEED

1. Two vessels large enough to fully immerse the mallet end of the Intank type.
2. Two known concentrations of suspended solids: one at the low end of the measurement range and the other at the high end. For example, if the desired measurement range is 0 to 100 ppm then the low-end concentration should be between 1 and 10 ppm and the high-end concentration should be 90 - 100 ppm. A convenient method is to first make a known concentration representing the high end of the measurement range and then diluting a portion of it with distilled water to get the low-end concentration. DO NOT USE 0 ppm as the low-end concentration. ALWAYS use the actual suspended solids to be measured to makeup the test solutions since the calibration depends on the nature of the suspended solids particles such as average diameter. For example in a wastewater treatment plant, if the effluent is being monitored, do not make up the calibration solutions by diluting the influent. The influent particles on average are of greater diameter and also have a wider diameter variance than the effluent suspended solids particles. Calibration using the influent will not necessarily hold true for the effluent.
3. A source of clean water to clean the sensor between immersions. This can be a hose or a vessel filled with clean water.

PROCEDURE

- Press the CALIBRATION key, then press 1 for Auto Cal.
- Immerse the sensor in the first calibration solution. Move the sensor around in the vessel for about a minute to keep the suspended solids from settling and to get a stable reading on the bottom line of the display. Enter the concentration of the calibration solution via the keypad then press the ENTER key.
- The unit now prompts for the 2nd calibration concentration. Remove the sensor from the first vessel and use the CLEAN water to wash it. Dry the sensor as much as possible by waving it before placing it in the vessel containing the 2nd. calibration solution. Move the sensor around as before for about a minute to stabilize the reading. Enter the concentration via the keypad then press the ENTER key. If the calibration was not successful, an error message is flashed on the screen for 2 seconds. Common problems are either the sensor was not moved from the first calibration solution or that the 2nd. concentration value was entered identical to the 1st.
- At the end of a calibration, the unit calculates 2 parameters that it uses to determine suspended solids concentrations: SLOPE and OFFSET. The Slope indicates the sensitivity or rate of change of

measured signal with a change in the concentration The Offset is the calculated signal value for a concentration of 0. These values may be displayed by pressing 3 for Slope/Offset from the CALIBRATION menu. RECORD these values for later reference in SECTION 6 of this manual. These values may be re-entered instead of recalibrating using Auto Cal.

MANUAL CALIBRATION

Follow this procedure if 2 unknown concentrations representing the high and low end of the measurement range can be made up or "grab sampled" during calibration. This procedure allows the measured signal from each concentration to be recorded first. The samples may then be sent to a lab for accurate analysis. The results of the analysis are then entered in to the unit to complete the calibration.

WHAT YOU WILL NEED

1. Two vessels large enough to fully immerse the mallet end of the sensing yoke.
2. Two unknown concentrations of suspended solids but roughly representing the low and high end of the desired measurement range. For example, if the desired measurement range is 0 to 100 ppm then the low-end concentration should be between 1 and 10 ppm and the high-end concentration should be 90 - 100 ppm. A convenient method is to get a concentration representing the high end of the measurement range and then diluting a portion of it with distilled water to get the low-end concentration. DO NOT USE 0 ppm as the low-end concentration. ALWAYS use the actual suspended solids to be measured to makeup the test solutions since the calibration depends on the nature of the suspended solids particles such as average diameter.
3. A source of clean water to clean the sensor between immersions. This can be a hose or a vessel filled with clean water.

PROCEDURE

- Press the FUNCTION key, then press 2 for Diagnostics. Locate the SR displayed value on the 3rd line (from the top) of the display.
- Immerse the sensor in the first calibration solution. Move the sensor around in the vessel for about a minute to keep the suspended solids from settling and until the signal level on the bottom line of the display stabilizes. Record the SR value (SR1).
- Remove the sensor from the first vessel and use the CLEAN water to wash it. Dry the sensor as much as possible by waving it before placing it in the vessel containing the 2nd. calibration solution. Move the sensor around as before for about a minute. Record the SR value (SR2).
- Have the calibration solutions analyzed in the units desired.
- Press the CALIBRATION key, then press 2 for Manual Cal.
- Enter the analyzed suspended solids value corresponding to SR1 then press the ENTER key.
- Enter the SR1 value then press the ENTER key.
- Similarly enter the analyzed suspended solids value corresponding to SR2 and then SR2 followed by the ENTER key in each case.
- At the end of a calibration, the unit calculates 2 parameters that it uses to determine suspended solids concentrations: SLOPE and OFFSET. The Slope indicates the sensitivity or rate of change of

measured signal with a change in the concentration The Offset is the calculated signal value for a concentration of 0. These values may be displayed by pressing 3 for Slope/Offset from the CALIBRATION menu. RECORD these values for later reference in SECTION 6 of this manual. These values may be re-entered instead of recalibrating using Auto Cal.

3.3.7 ENABLE ALARM RELAY CONTROL

- If the Alarm Relays are being used, now that calibration has been successfully completed, the Alarm Relay control may be re-enabled.
- Press the CONTROL key to get to the CONTROL menu, then 1 for Relay Settings then 3 to Enable.
- The right, bottom corner of the display should show ON.

PRESS THE DISPLAY KEY TO GO BACK TO THE DISPLAY MENU

THIS COMPLETES THE SETUP AND CALIBRATION PROCEDURE FOR THE SM8830 SUSPENDED SOLIDS TRANSMITTER

4.0 OPERATION

IN THE FOLLOWING TEXT A MENU WILL BE DISPLAYED AS A PATH. FOR EXAMPLE THE
AUTOCAL MENU: [CALIB\ 1]. (CALIB key then 1 for AUTOCAL).
SETTINGS MENU: [FUNCTION\3] (FUNCTION key then 3 for SETTINGS).

The SM8830 Suspended Solids transmitter uses a laser beam source and fiberoptic optical system to measure suspended solids. An intense, coherent beam is passed through the liquid under test. The light is launched from the laser via a glass fiber. Directly opposite, the beam is received by another fiber that conducts it to a detector. Both laser and detector are mounted in the Light Transmitter enclosure and only the fibers are in direct contact with the liquid to increase reliability.

The intense, coherent, collimated beam is scattered by suspended solids particles in the liquid which decrease the beam intensity at the receiver fiber. The relationship between the received light and the concentration of suspended solids particles is mathematically predictable over the measurement range of the instrument. The laser beam approaches beam extinction theory and is much more predictable than non-coherent light sources like tungsten lamps and LED's. This high degree of predictability allows a 2-point calibration without the need for "best fit" calibration curves.

The SM8830 can perform a number of tasks simultaneously (multitasking software). This means that even while in another menu, the suspended solids concentration is always being measured in the background. For example if the Filter value is being set in the SETTINGS submenu (FUNCTION\SETTINGS menu), the concentration value, relay alarms and 4-20mA outputs are still being updated. This is important since keypad entries are typically slow and sometimes an operator might forget to return the unit to the normal DISPLAY menu: in this case Alarm relays and 4-20mA output are still updated. In some menus however, the 4-20mA output and or the Alarm Relays are not updated on purpose; for example while in the calibration menu, the unit assumes that the unit is being calibrated and so the calculated level may be erroneous. In this case, the 4-20mA and Alarm Relays are set to the inactive states.

For high concentrations when the light reading is low, the background interference due to ambient light may become a factor. At this time, the laser is switched off every 30 seconds for about 10 seconds during which time the interference is measured and subtracted from the measured signal.

Periodically, (every 5-10 seconds) the unit does a self-diagnostic. If major errors are found they are displayed on the LCD. These error messages take precedence over the concentration information in the DISPLAY menu ONLY. All other menus may be entered and parameters viewed or changed. In case of errors, this allows the user to enter the DIAGNOSTICS menu and check the sensor signal to identify the cause of the problem.

4.1 DISPLAY MENU [DISP]

This is the default or normal operating screen. It shows:

****SUSPENDED SOLIDS****
200.0 ppm
Output 20.0 %
zzzz

The 2nd line shows the suspended solids concentration in one of 5 engineering units that may be selected in the configuration menu.

The 3rd line shows the SM8830 transmitter output as a percent of Full Scale (Span value)..

The 4th line displays a bargraph of the suspended solids concentration as a percent of Full Scale. The resolution is 5%.

The Status Indicator (see figure 3.0) should be green. If this is red then the LCD displays the kind of System Error. See the troubleshooting guide for details.

4.2 CALIBRATION [CALIB]

The unit may be calibrated 3 different ways: Automatic Calibration and 2 Manual Calibrations. Pressing the CALIBRATION key enters the CALIBRATION menu:

****TANK CALIBRATION****
1-Auto 2-Manual
3-Slope/Off

4.2.1 AUTOMATIC CALIBRATION [CALIB\1]

This is typically done for a new installation. It involves immersing the sensor into 2 ACCURATELY KNOWN concentrations and entering the concentrations via the keypad in each case. The unit then calculates 2 parameters: SLOPE and OFFSET by correlating the 2 entered values with the corresponding measured light signal. The SLOPE is the change in measured signal per change in the concentration. The OFFSET is the calculated signal for a concentration of 0. The Automatic Calibration procedure is already described in Section 3.3.5.

NOTE: The accuracy of the calibration depends in large part on the accuracy of the 2 measured concentrations entered during calibration. The resolution of measurement should be as high as possible and as far apart as possible within the expected measurement range. This is why the 2 test solution concentrations should be from the low and high end of the expected measurement range: the larger the difference, the less affect the inaccuracies of entered levels has on the calibration. For example, a 1% error in entered values over a 10% change translates to a 10% error at Full Scale (100%).

NOTE: if the SLOPE and OFFSET parameters are already known, they may be entered directly by selecting SLOPE/OFF (item 3 from the Cal menu). This can save a lot of time.

4.2.2 MANUAL CALIBRATION [CALIB\2]

This option allows a precalibration on 2 unknown concentrations (again from the low and high end of the expected measurement range). The calibration can then be completed after the accurate concentrations have been determined. The procedure is already described in section 3.3.5

4.2.3 SLOPE AND OFFSET [CALIB\3]

Use this feature to view and or modify the SLOPE and OFFSET calibration values directly.

- Press the CALIBRATION key to enter the CALIBRATION menu then 3 for Slope/Off.
- Enter the desired SLOPE and OFFSET. If no change is desired just press the Enter key in each case or a Menu key to go to another menu such as the DISPLAY menu.

4.3 CONTROL MENU [CONT]

The CONTROL menu allows the setup of the 4-20mA output and the Control Relays.

NOTE: The Control Relays and the 4-20mA output are set to their OFF states when in the CALIBRATION menu [CALIB]. In the DIAGNOSTICS menu [FUNCTION \ 2], the 4-20mA output may be set manually by the operator to 4mA or 20mA. In this case the 4-20mA output does not reflect the suspended solids concentration.

Setup of the Control Relays, and the 4-20mA output is described in section 3.

The action of the relays may be set to Normally Off (No Fail-Safe) or Normal ON (Fail-Safe) by setting the switch on the relay modules on the backplate to the Normal On or Normally Off position respectively. With Fail-Safe ON, relays are set to their unpowered or non-energized state when the level exceeds the corresponding relay setpoint for at least the delay time. In this case, if the controller fails (no power) then the relays are in the alarm condition. Regardless of the relay action, **ALL relay indicators on the front panel are HI ACTING. i.e. the indicator on the front panel will light when the level is HIGHER than the relay's programmed Setpoint.**

The 4-20mA output Zero and Span settings may be set anywhere within the measurement range. For example, if the Zero is set to 30% level and the Span is set at 60% level then the mA output is scaled between these two points with the mA output indicating low level at 30% and high level at 60%. NOTE: the Span value (% level) must be at least 1% greater than the Zero value.

The 4-20mA output may also be set to Direct or Inverse Acting. In Direct Action, the mA output is 4mA when the level is at the Zero level and 20mA when at the Span level. In Inverse Action, the mA output is 20mA when the level is at the Zero level and 4mA when at the Span level.

4.3 FUNCTION MENU [FUNC]

The FUNCTION menu is used for one-time setup and for Diagnostics.:

*******FUNCTION*******
1-Diags
2-Settings
Assist: 800 387 9487

4.3.2 DIAGNOSTICS [FUNC \ 1]

This menu displays the received frequency coded light signal from the remote Light Transmitter at the sensor. and the calculated capacitance. Both of these values are useful in determining calibration or performance problems.

****DIAGNOSTICS** S2**
ON: xxxx.x OF: xxxx.x
SR: xxxx.x Ln: x.xxx
1-4mA 2-20mA

Sx: (on first line) indicates the autoranging scale value from 0 to 2. 0 is for high concentrations

ON: light reading when laser is on

OF: light reading when laser is off (interference or noise signal)

SR: Corrected light signal: On value minus Off value

Ln: Linearized signal value used to calculate the suspended solids value.

Pressing key 1 forces the mA output to 4mA. Similarly pressing key 2 forces the mA output to 20mA. This is convenient to check the performance of external recorders or PLC's which read the mA output. The mA output reverts back to its actual level when the normal Display Menu is selected.

4.3.3 SETTINGS MENU [FUNC \ 2]

This menu sets the digital filter and the engineering units. In addition the mA output may be trimmed for maximum accuracy. Also the Tag number and Software revision may be viewed:

******** SETTINGS ********
1-mA trim 2-Filter
3-Tag No. 4-Units
Rev: xxxxxx

mA TRIM:

This procedure trims the mA output for maximum accuracy by compensating for the mA output circuitry tolerances. THIS PROCEDURE IS PERFORMED ON EVERY TRANSMITTER AT THE FACTORY AND IS TO BE PERFORMED BY AUTHORIZED PERSONNEL ONLY. IF IMPROPERLY DONE, THE ACCURACY OF THE mA OUTPUT IS AFFECTED.

Under certain conditions this procedure may be undertaken in the field with Claritek's permission:

- Press the FUNCTION key, then 3 for Settings and then 1 for mA Trim. The unit should put out what it thinks is 20.0 mA.
- Disconnect any load connected to the mA output of the transmitter.
- With an ACCURATE MULTIMETER MEASURE THE mA OUTPUT. The Multimeter should have at least one place of decimal.
- Enter this value at the prompt and press the Enter key. A maximum tolerance adjustment of 3% is allowed i.e. the entered value must be in the range of 19.4 mA to 20.6 mA. If a value out of this range is entered an error is flashed on the screen. If this occurs, contact an Claritek representative for assistance.

The **FILTER** and **(ENG) UNITS** settings are described in Section 3.3.1 and 3.3.2 respectively.

THE **TAG NO.** IS USED ONLY FOR NETWORK APPLICATIONS AND ARE USUALLY FACTORY SET. In a Network Application, each transmitter connected to the network (called a network slave) has a unique Tag No. The Central Access Panel (CAP) which is also called a Network Master communicates with each network slave via its Tag No. This menu allows viewing the Tag No. ONLY. To Change the Tag No., the Tag Switch on the Microcontroller card behind the front panel has to be set. Please refer to the Network Applications Manual for details.

5.0 TROUBLESHOOTING

CONDITION	DO THIS
1. DISPLAY MENU SHOWS: Error: No Xmtr Signal	The unit is not receiving a frequency signal from the remote Light Transmitter at the sensor: Check wiring.
2. DISPLAY MENU SHOWS: Error: Setup Values Bad	This indicates that one of the calibration or setup parameters has been corrupted. Compare ALL parameters with the table in Section 6.0 to indicate which one. Re-enter it Call Technical Support
3. DISPLAY MENU SHOWS: Error: Sensor out of range	The measured light signal from the Light Transmitter is out of range. The concentration may be too high. Remove the sensor from the liquid if possible. If the error message disappears then the concentration is too high. Call Technical Support
4. DISPLAY MENU SHOWS: Error: Low Power	The power to the unit is less than the required minimum. Check the power connection.
5. The level reading is erratic or unstable	Confirm the Slope and Offset values recorded after the last successful calibration. The should be recorded in Section 6 of this manual. Clean the optical windows of the sensor If the windows are dirty then the optional window cleaning flushing system should be installed.
6. Display is dim or not enough contrast.	The contrast may be adjusted using a fine screwdriver. The adjustment trimmer is located on one of the 2 cards mounted on the rear of the front plate. Locate the ribbon cable from the Display to a card. The trimmer is blue and the adjustment is on a vertical edge facing the Display. Adjust the trimmer to the desired contrast.

CLARITEK TECHNICAL SUPPORT

CONTINENTAL NORTH AMERICA WIDE TOLL FREE NUMBER

(800) 387-9487

6.0 CONTROLLER SETTINGS SHEET

PARAMETER	DESCRIPTION	FACTORY SETTING	USER SETTING
Slope	Result of a successful Calibration: Measured light change per concentration change. Used by unit to calculate the suspended solids concentration from the light reading.		
Offset	Result of a successful Calibration: Calculated light reading for a concentration of 0. . Used by unit to calculate the suspended solids concentration from the light reading.		
Zero	Value in engineering units to indicate a low concentration value on the 4-20mA output.	**0.0**	
Span	Value in engineering units to indicate a high concentration value on the 4-20mA output.	**100.0**	
mA Action	Direct (20mA when level at Span) or Inverse (4mA when level is at Span	**DIR**	
Relay1 Hi Set	Alarm Relay 1 High Setpoint: Alarm condition if level is above this value.	**85.0%**	
Relay1 Lo Set	Alarm Relay 1 Low Setpoint: Alarm conditions cleared if level is below this value.	**80.0%**	
Relay2 Hi Set	Alarm Relay 2 High Setpoint: Alarm condition if level is above this value.	**65.0%**	
Relay2 Lo Set	Alarm Relay 2 Low Setpoint: Alarm conditions cleared if level is below this value.	**60.0%**	
Relay3 Hi Set	Alarm Relay 3 High Setpoint: Alarm condition if level is above this value.	**45.0%**	
Relay3 Lo Set	Alarm Relay 3 Low Setpoint: Alarm conditions cleared if level is below this value.	**40.0%**	
Alarm Delay	Amount of time the level must be above the Hi Setpoint for the Alarm condition to be set.	**0 sec**	
Alarm Enable	Master Alarm Relay Enable: If Off this will prevent relays from being reflecting the Alarm condition. The relay will remain in the non alarm condition base on the Fail-Safe switch setting on the relay modules	**OFF**	
Filter	Digital Filter response time in seconds. Used to smooth out level fluctuations caused by splashing etc.	**0 sec**	
Engineering Units	Eng. units chosen to display level information in addition to the level in %.	**ppm**	